

DATA REPLICATION SCHEME FOR NEIGHBOR
REPLICATION ON GRID

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WAN SURYANI BINTI WAN AWANG

May 2005

Chairperson: Professor Mustafa Mat Deris, Ph.D.

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In today's Internet world, the thirst for a reliable data across Web Server Cluster (WSC) is very crucial. WWW applications such as financial transactions, distant learning, e-commerce and e-business, etc generally require non-stop services.

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In today's Internet world, the thirst for a reliable data across Web Server Cluster (WSC) is very crucial. WWW applications such as financial transactions, distant learning, e-commerce and e-business are generally require non-stop services. The explosively increasing of the internet users and accesses consequently contribute to this demand for data availability and reliability. The ideal architecture design for data replication scheme in a cluster server system can be achieved by providing availability, consistency and reliability of data replica. Currently Web Server Cluster with different data replica distribution patterns provides different data availability level. These level of differences play

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significant 'state of the art' towards the ideal data replication distribution technique on a cluster of workstations. In this research a new technique called Neighbor Replication on Grid Technique (NRG) which focus on data replica scheme based on asynchronous approach is put forward to improve data reliability and availability in distributed database system. The implementation of Neighbor Replication on Grid-Data Replica Scheme (NRG-DRS) provides higher reliability by imposing a neighbor logical structure on data copies. In addition, NRG-DRS implementation also covers fault-tolerant whereby the data is still available in the presence of node failures. This is another important aspect of data replica which provides the ability to achieve high availability by having more than one node to fulfill data requests.

Abstrak tesis yang dikemukakan kepada Senat Kolej Universiti Sains dan
Teknologi Malaysia sebagai memenuhi keperluan ijazah Sarjana Sains

SKEMA REPLIKASI DATA UNTUK REPLIKASI KEJIRANAN GRID

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Dunia Internet hari ini amat memerlukan kebolehpercayaan data di dalam kelompok pelayan web. Aplikasi web seperti transaksi kewangan, pengajian jarak jauh, e-perdagangan dan e-perniagaan secara umumnya memerlukan perkhidmatan tanpa henti. Pertambahan kepada ledakan pengguna internet dan pengaksesan menyumbang kepada kehendak data dalam bentuk ketersediaan dan kebolehpercayaan. Justeru itu skema replikasi data memerlukan rekabentuk sistem yang ideal untuk menyumbang kepada ketersediaan, konsistensi, dan kebolehpercayaan replikasi data. Corak pengagihan replikasi data yang berbeza mempunyai peningkatan tahap ketersediaan data yang juga berbeza di dalam

kelompok pelayan web. Perbezaan corak replikasi data ini menjadikan teknik replikasi data lebih terdedah dan terbuka kepada penyelidikan untuk membangunkan rekabentuk ideal bagi teknik pengagihan replikasi data.

Tesis ini memaparkan Skema Replika Data untuk Teknik Replikasi Kejiranan Grid yang lebih mengfokuskan kepada replikasi data berdasarkan penghantaran tak segerak ('asynchronous') untuk meningkatkan kebolehpercayaan dan ketersediaan data di dalam sistem pengagihan pangkalan data. Teknik Replikasi Kejiranan Grid (NRG-DRS) menghasilkan data yang lebih dipercayai dengan struktur kejiranan (perhubungan nod dengan nod yang berjiran/terdekat) secara logikal ke atas salinan data. Di samping itu teknik NRG-DRS juga menyediakan fungsi toleransi kesalahan di mana ketersediaan data masih boleh di perolehi walaupun nod atau pelayan tidak aktif atau gagal berfungsi. Ini merupakan salah satu aspek yang terpenting bagi replikasi data yang mana ketersediaan data dapat di pertingkatkan dengan cara lebih daripada satu nod tersedia untuk memenuhi kehendak data.